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(54) Web intake apparatus

(57) A web intake apparatus comprises a web intake device in the form of a band 16 provided at a free end with a holding device 18 for holding the end of a paper web, and a drive unit 4, 22 for driving the band 16. The band 16 is relatively stiff in lateral and downward directions and can be moved by the drive unit, without the use of guides, through a channel (11) passing through web treating equipment. The drive unit 4, 22 can operate by frictional driving action on the underside of the band.

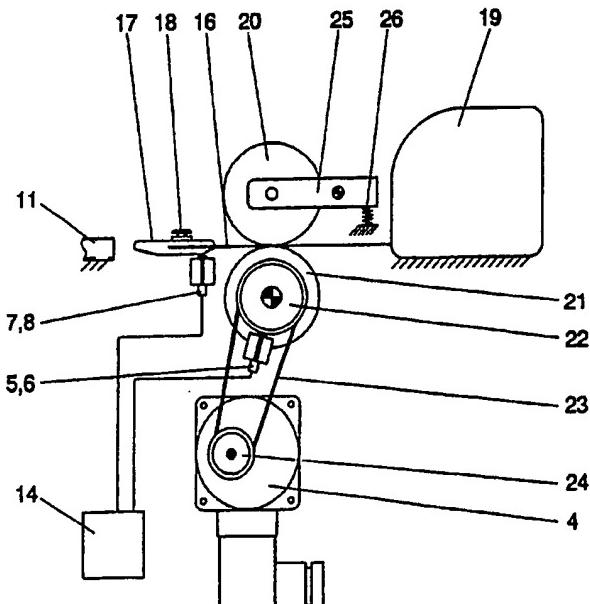


Fig. 2

GB 2 290 286 A

1/2

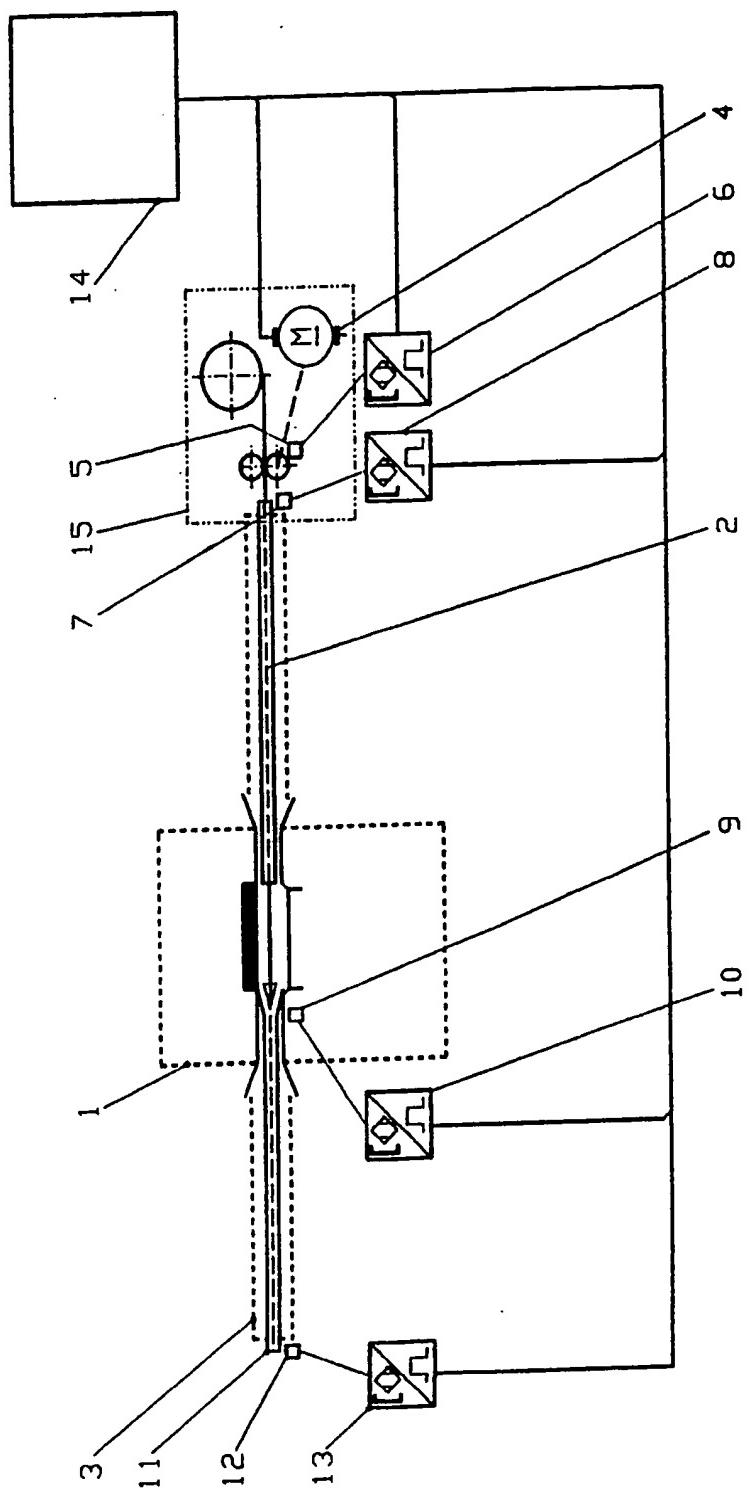


Fig. 1

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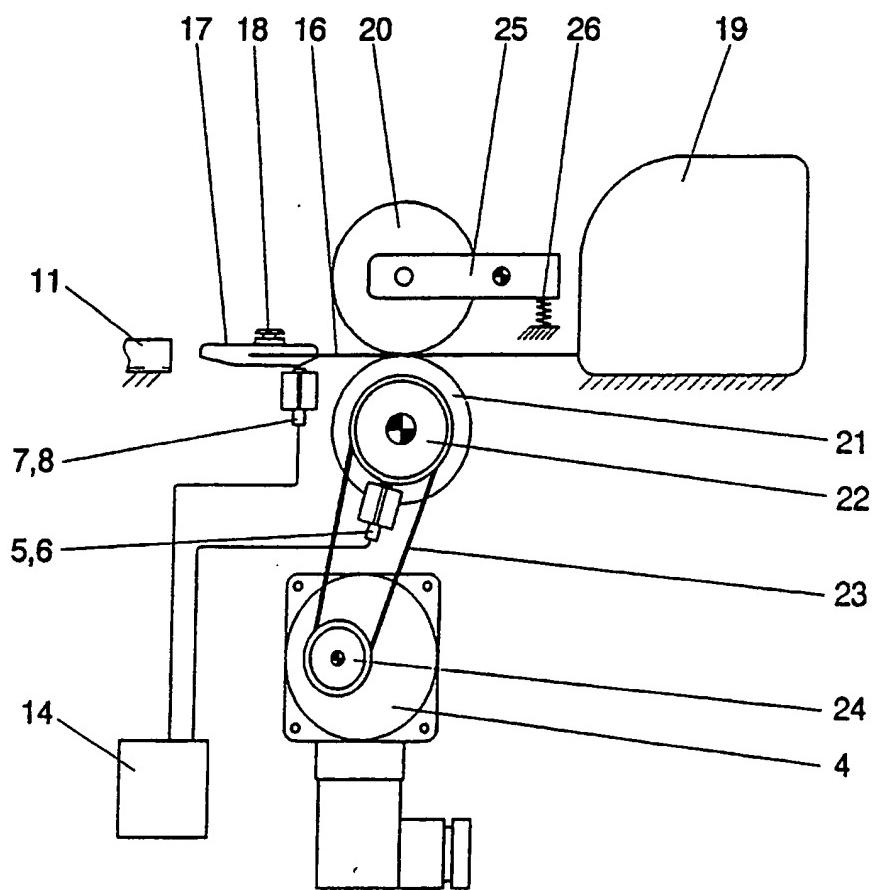


Fig. 2

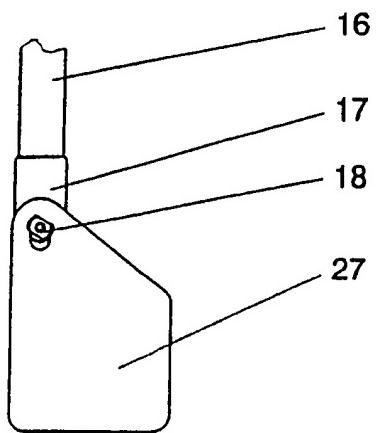


Fig. 3

WEB INTAKE APPARATUS

The present invention relates to web intake apparatus for a web treating or processing machine, for example a roller printing machine.

Intake apparatus for the intake of a paper web in a roller printing machine is described in EP-PS 0 418 903, wherein a web intake guide extends along an intake path from an unrolling point to shortly before folding equipment. A rolling-up device for rolling up the web intake element, which is preferably formed as a band, is arranged at the end of the intake path. At the end of the intake process of the paper web, the intake band is disposed in the rolling-up device and must, for the purpose of a new intake process, be returned to the initial position. Due to the twisty transport path within the printing machine it is necessary to use a band which is flexible in all directions. Mounted at the free end of the band is a web holding device which firmly holds the paper web at its start end, preferably by means of clamping force.

A disadvantage of this apparatus is the need for a paper web intake guide and also the threading back of the web intake components for a new web intake. In the case of, in particular, web channel guides which are screened at all sides, this web intake device is costly, complicated and suitable only for uninterrupted web intake guides.

There is thus a need for web intake apparatus which does not require a web intake guide and which may be usable for a screened channel guide.

According to the present invention there is provided web intake apparatus comprising web intake means, a web holding device arranged at the start of the intake means, and a drive unit for driving the intake means, characterised in that the drive unit produces an advancing force, and the intake means is constructed to have a stiffness downwardly and

laterally, and control and indicating means controlling the position of the web intake means and the drive unit is arranged within the apparatus.

Advantageously, the drive unit comprises a stepping motor, which is connected with the control and indicating means and which moves the
5 intake means forwardly by means of a first toothed belt pulley, which is connected with a second toothed belt pulley by way of a toothed belt.

In order to achieve a frictionless web intake, the intake means can have at its start a guide member with a bevelled edge.

A reliable functioning of the intake means can be enhanced if
10 sensors, which check the presence of the guide member at predetermined locations, are associated with the transport path within the control and indicating means.

A simple and rigid construction of a band serving as the intake means can be achieved if the side edges thereof are bowed upwardly.

15 Preferably, a sensor detecting teeth moving past is associated with the second pulley. This arrangement has proved advantageous for simple detection of the transport path covered.

For an exact detection of the transport path covered it is of advantage if a counterpressure wheel acting on the band is connected with
20 an increment transmitter.

A high degree of accuracy in the detection of the transport path can be achieved if markings are applied to the underside of the band and a sensor scanning the markings is arranged in front of the entrance of a channel through which the band runs.

25 An embodiment of the present invention will now be more particularly described by way of example with reference to the accompanying drawings, in which:

Fig. 1 is the schematic view of web intake apparatus embodying the invention;

Fig. 2 is a schematic elevation of a drive unit in the apparatus; and

5 Fig. 3 is a view, to an enlarged scale, of the end of a web intake band of the apparatus.

Referring now to the drawings, there is shown in Figs. 1 and 2 web intake apparatus in a roller printing machine with electron beam drying equipment 1.

10 In the drying equipment 1 a paper web 2 is to be drawn through a radiation channel without web intake guides. The web 2 is transported through a web running channel 11 before and after the drying equipment 1. The channel 11 is encased by a screen 3 in order to prevent radiation loading of the environment.

15 A laterally upwardly bowed band 16 of steel is used as web intake means. The band 16 is moved forwardly by a drive unit 15, which is controlled by digital control and indicating equipment 14 (not illustrated in detail).

For checking the presence of the band 16, a sensor 7 is arranged at
20 the entrance of the channel 11, a sensor 9 is arranged at the exit of the drying equipment 1 and a sensor 12 is arranged at the exit of the channel 11, as seen from the drive unit 15.

The sensor 7 generates a signal when the band 16 has been guided in
orderly manner into the channel 11. The sensor 9 generates a signal when
25 the radiation chamber of the drying equipment has been passed by the band 16 without hindrance and the sensor 12 generates a signal when the band 16 has reached the end of the channel 11 and thus triggers the conclusion

of the band transport.

The sensor 5 in the drive unit 16 serves for detection of the transport path that has been covered.

The sensors 5, 7, 9 and 12 are functionally connected with, 5 respectively, pulse converters 6, 8, 10 and 13. These serve for conversion of the detected signals into digital signals, which are conducted to the digital control and indicating equipment 14.

One possible form of the drive unit 15 is illustrated in Fig. 2. Within the drive unit 15, a stepping motor 4 moves a toothed belt pulley 10 24. The movement is transmitted in a preset translation ratio by way of a toothed belt 23 to a toothed belt pulley 22. The pulley 22 is connected with a transport wheel 21 by way of a common axle and thus drives the band 16 in the direction of the channel 11.

A guide member 17, which is bevelled at the front, is mounted at the 15 front end of the band 16. Small vertical deviations from the guide plane can thereby be compensated for after overcoming the free path of the channel 11.

Mounted on the upper side of the guide member 17 is an entraining element 18, to which the end of the web to be drawn in is fastened. This 20 can be effected by a clamping element or by a glue connection.

In order to ensure the secure transport of the band 16, a counterpressure wheel 20 is arranged on the side opposite the transport wheel 21. The counterpressure force is generated by a spring 26 acting by way of the lever arm 25.

25 Before the start of the intake process, the band 16 is accommodated in rolling-up equipment 19.

The sensor 5 detects the number of teeth running past of the toothed .

belt pulley 22 and delivers corresponding signals to the control and indicating equipment 14, which compares the signals with preset values, determines therefrom the transport path covered by the band 16 and thus detects the band actual position.

5 The sensor 7 generates a signal when the guide member 17 runs into the channel 11.

For positional detection of the band 16 with particularly high accuracy, line markings are applied to the underside of the band 16, which markings are detected by the sensor 7 and evaluated by the control 10 and indicating equipment 14. In this case the sensor 5 is no longer necessary.

The web holding device is illustrated in Fig. 3. The guide member 17 is fastened to the band 16 and to this, by way of the entraining element 18, a holding plate 27 to which the end of the paper web is 15 glued.

CLAIMS

1. Web intake apparatus for a web treating or processing machine, comprising web intake means constructed to be stiff in downward and lateral directions and provided at an end thereof with holding means for holding the end of a web, drive means operable to generate an advancing force to move the intake means, and control means arranged within the apparatus and operable to control the drive means and the position of the intake means.
2. Apparatus as claimed in claim 1, the drive means comprising a stepping motor controlled by the control means and drive transmission means to transmit drive from the motor to the intake means.
3. Apparatus as claimed in claim 2, the transmission means comprising a drive toothed pulley, a driven toothed pulley and a toothed belt connecting the pulleys.
- 15 4. Apparatus as claimed in any one of the preceding claims, the holding means comprising a guide member with a bevelled guide edge.
5. Apparatus as claimed in claim 4, the control means comprising detecting means arranged to detect the position of the guide member along a predetermined path of movement thereof.
- 20 6. Apparatus as claimed in any one of the preceding claims, the intake means comprising a band.

7. Apparatus as claimed in claim 6, wherein the edges of the band are bowed upwardly.
8. Apparatus as claimed in claim 3, the control means comprising monitoring means to monitor rotation of the drive pulley by counting the 5 pulley teeth moving past a reference point.
9. Apparatus as claimed in any one of the preceding claims, comprising a counterpressure wheel to oppose a component of force exerted on the intake means by the drive means.
10. Apparatus as claimed in claim 9, the control means comprising an 10 increment transmitter to monitor rotation of the counterpressure wheel.
11. Apparatus as claimed in claim 6, wherein the band is provided on its underside with markings and the control means comprises scanning means operable to scan the markings, the band being movable through a channel and the scanning means being arranged in front of an entrance of the 15 channel.
12. Web intake apparatus substantially as hereinbefore described with reference to the accompanying drawings.
13. A rotary printing machine for printing on a web of paper, the machine including web intake apparatus as claimed in any one of the 20 preceding claims.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

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Relevant Technical Fields

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(ii) Int Cl (Ed.6) B41F; 13/02, 13/03 B65H 20/00

Search Examiner
P A MAKIN

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Date of completion of Search
16 AUGUST 1995

(ii) ONLINE: WPLI

Documents considered relevant
following a search in respect of
Claims :-
1-13

Categories of documents

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| X: | Document indicating lack of novelty or of inventive step. | P: | Document published on or after the declared priority date but before the filing date of the present application. |
| Y: | Document indicating lack of inventive step if combined with one or more other documents of the same category. | E: | Patent document published on or after, but with priority date earlier than, the filing date of the present application. |
| A: | Document indicating technological background and/or state of the art. | &: | Member of the same patent family; corresponding document. |

Category	Identity of document and relevant passages	Relevant to claim(s)
A	US 5078825 (HIRABAYASHI) whole document	1

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